

### REMARKS/ARGUMENTS

Claims 13-16 and 18-32 are pending in this application. By this Amendment, Applicant cancels Claim 17 and amends Claims 18, 19, 22, 26-28, and 32.

Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Isobe (JP 07-212174) in view of Irino et al. (Optimized Stoneley Wave Device by Proper Choice of Glass Overcoat). Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Irino et al. and Isobe, and further in view of Itakura et al. (U.S. 2003/011281). Claim 16 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Irino et al. and Isobe, and further in view of Ogawa (WO 98/052279). Claims 17-24 and 26-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Isobe in view of Wakino et al. (U.S. 4,388,600). Claim 26 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wakino et al. and Isobe, and further in view of Irino et al. Applicant notes that although the Examiner listed claim 26 in this prior art rejection, it appears that the Examiner intended to list claim 25 because (1) the Examiner discusses the feature recited in claim 25, and (2) claim 26 was previously rejected over the combination of Wakino et al. and Isobe. Claim 17 has been canceled. Applicant respectfully traverses the rejections of Claims 13-16 and 18-32.

Claim 13 recites:

A boundary acoustic wave device comprising:  
a first medium layer and a second medium layer arranged such that a boundary acoustic wave propagates along a boundary between the first medium layer and the second medium layer; wherein  
**a sound velocity of the second medium layer is lower than a sound velocity of the first medium layer, and a thickness of the second medium layer is at least about  $7\lambda$ , where the wavelength of the boundary acoustic wave is represented by  $\lambda$ .** (emphasis added)

With the unique combination and arrangement of features recited in Applicant's Claim 13, including the features of "a sound velocity of the second medium layer is lower than a sound velocity of the first medium layer, and a thickness of the second medium layer is at least about  $7\lambda$ , where the wavelength of the boundary acoustic wave

is represented by  $\lambda$ ," Applicant has been able to provide a boundary acoustic wave device which effectively suppresses unwanted spurious signals and which provides superior frequency properties (see, for example, paragraph [0015] on page 5 of the originally filed specification).

The Examiner alleged, "Isobe discloses boundary acoustic wave device comprising: a first medium layer ( $\text{LiTaO}_3$ ) and a second medium layer ( $\text{SiO}_2$ ) arranged such that a boundary acoustic wave propagates along a boundary between the first medium layer and the second medium layer; wherein a sound velocity of the second medium layer is lower than a sound velocity of the first medium layer, and a thickness of the second medium layer is at least about  $3\lambda$ ." The Examiner acknowledged that Isobe fails to disclose the thickness of the second medium layer being at least  $7\lambda$ .

The Examiner further alleged, "Irino discloses a similar embodiment wherein the thickness of the second layer is preferably a high value for exiting the medium. Specifically Irino teaches: a person skilled in the art will gather that the boundary acoustic wave (Stoneley wave) will only be excited when the thickness of the medium layer ( $\text{SiO}_2$ ) is greater than three times the wavelength. Therefore the limitation of the  $\text{SiO}_2$  layer having a thickness greater than  $7\lambda$  is being anticipated by Irino." Applicant respectfully disagrees.

First, Isobe specifically teaches the temperature characteristics of the boundary acoustic wave device disclosed therein become extremely good when the thickness of the  $\text{SiO}_2$  layer is between  $1\lambda$  and about  $3\lambda$  (see, for example, paragraph [0011] of the English machine translation of Isobe). Contrary to the Examiner's allegation, Isobe neither teaches nor suggests that the thickness of the  $\text{SiO}_2$  layer is at least about  $3\lambda$ , or that the thickness of the  $\text{SiO}_2$  layer could or should be any value over about  $3\lambda$ . In fact, Isobe specifically teaches that the temperature characteristics are extremely good only when the thickness of the  $\text{SiO}_2$  layer is between  $1\lambda$  and about  $3\lambda$ . Thus, regardless of the alleged teachings of Irino et al., one of ordinary skill in the art would certainly not have increased the thickness of the  $\text{SiO}_2$  layer to at least  $7\lambda$ , as alleged by the Examiner, because doing so would render the boundary acoustic wave device of Isobe

unsatisfactory for its intended propose of improving the temperature characteristics thereof.

The Examiner is reminded that if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) and MPEP § 2143.01.

Second, the Examiner's allegation that a person skilled in the art will gather from Irino et al. that the boundary acoustic wave (Stoneley wave) will only be excited when the thickness of the medium layer ( $\text{SiO}_2$ ) is greater than three times the wavelength is completely untrue with respect to the boundary acoustic wave device of Isobe. As specifically disclosed in Isobe, the boundary acoustic wave is excited when the thickness of the  $\text{SiO}_2$  layer is at least  $0.5\lambda$  (see, for example, Drawing 1 of Isobe). Thus, contrary to the Examiner's allegations, a person skilled in the art would clearly not have gathered from Irino et al. that the boundary acoustic wave in the boundary acoustic wave device of Isobe will only be excited when the thickness of the  $\text{SiO}_2$  layer is greater than three times the wavelength, because it is simply untrue.

Third, the Examiner has provided absolutely no credible motivation or reason to modify the boundary acoustic wave device of Isobe such that the thickness of the  $\text{SiO}_2$  is at least about  $7\lambda$ , and as noted above, there would have been no credible motivation or reason to modify the boundary acoustic wave device of Isobe in this manner. Thus, the Examiner has clearly failed to establish a *prima facie* case of obviousness in the rejection of Claim 13 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Isobe in view of Irino et al.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Isobe in view of Irino et al.

The Examiner relied upon Itakura et al. and Ogawa to allegedly cure various deficiencies of Isobe and Irino et al. However, neither Itakura et al. nor Ogawa teaches or suggests the features of "a sound velocity of the second medium layer is lower than a

sound velocity of the first medium layer, and a thickness of the second medium layer is at least about  $7\lambda$ , where the wavelength of the boundary acoustic wave is represented by  $\lambda$ " as recited in Applicant's Claim 13. Thus, Applicant respectfully submits that Itakura et al. and Ogawa fail to cure the deficiencies of Isobe and Irino et al. described above.

Accordingly, Applicant respectfully submits that Isobe, Irino et al., Itakura et al., and Ogawa, applied alone or in combination, fail to teach or suggest the unique combination and arrangement of features recited in Applicant's Claim 13.

Applicant's Claim 18 has been amended to recite:

A boundary acoustic wave device comprising:  
a first medium layer and a second medium layer arranged such that a boundary acoustic wave propagates along a boundary between the first medium layer and the second medium layer; wherein  
a wave scattering structure is arranged to scatter an acoustic wave and disposed on at least one surface of the first and second medium layers at a side opposite to a boundary surface therebetween; and  
**a sound velocity of the second medium layer is less than a sound velocity of the first medium layer, and the wave scattering structure is provided on the second medium layer.** (emphasis added)

With the unique combination and arrangement of features recited in Applicant's Claim 18, including the features of "a sound velocity of the second medium layer is less than a sound velocity of the first medium layer, and the wave scattering structure is provided on the second medium layer," Applicant has been able to provide a boundary acoustic wave device which effectively suppresses unwanted spurious signals and which provides superior frequency properties (see, for example, paragraph [0015] on page 5 of the originally filed specification).

Applicant's Claim 18 has been amended to recite all of the features of Claim 17 and Claim 17 has been canceled.

The Examiner alleged that Isobe teaches all of the features recited in Applicant's Claim 18, except for the wave scattering structure. The Examiner further alleged that Wakino et al. teaches a wave scattering structure in the form of grooves. Thus, the

Examiner concluded that it would have been obvious to form grooves as taught by Wakino et al. on the surface of one of the layers to suppress an unnecessary spurious response. Applicant respectfully disagrees.

Wakino et al. is directed to a surface acoustic wave device which includes only a single substrate 1 (a first medium layer) made of a piezoelectric substrate, such as LiNbO<sub>3</sub>. Wakino et al. fails to teach or suggest (1) any second medium layer; (2) any grooves in a second medium layer; (3) that the grooves 4-10 could or should be provided in any structural element other than in the piezoelectric substrate; or (4) that the grooves 4-10 are suitable for use in a boundary acoustic wave device as recited in Applicant's Claim 18.

Thus, Wakino et al. clearly fails to teach or suggest any wave scattering structure provided in a surface of a second medium layer having a sound velocity less than the first medium layer 1.

Even assuming *arguendo* that the grooves 4-10 of Wakino et al. would be suitable for use in a boundary acoustic wave device, if the grooves 4-10 of Wakino et al. were included in the boundary acoustic wave device of Isobe, the resulting device would include grooves in the first medium layer, **NOT** in the second medium layer having a sound velocity that is less than the sound velocity in the first medium layer.

Applicant notes that in the rejection under 35 U.S.C. § 103(a) as being unpatentable over Isobe in view of Wakino et al., the Examiner did not even address the features recited in Applicant's Claim 18 or allege that Wakino et al. teaches or suggests the features recited therein, and, as noted above, Wakino et al. fails to teach or suggest such features.

Thus, the combination of Isobe and Wakino et al. certainly fails to teach or suggest the features of "a sound velocity of the second medium layer is less than a sound velocity of the first medium layer, and the wave scattering structure is provided on the second medium layer" as recited in Applicant's Claim 18.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claim 18 under 35 U.S.C. 103(a) as being unpatentable over Isobe in

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view of Wakino et al.

The Examiner relied upon Irino et al. to allegedly cure deficiencies of Isobe and Wakino et al. However, Irino et al. fails to teach or suggest the features of "a sound velocity of the second medium layer is less than a sound velocity of the first medium layer, and the wave scattering structure is provided on the second medium layer" as recited in Applicant's Claim 18. Thus, Applicant respectfully submits that Irino et al. fails to cure the deficiencies of Isobe and Wakino et al. described above.

Accordingly, Applicant respectfully submits that Isobe, Wakino et al., and Irino et al., applied alone or in combination, fail to teach or suggest the unique combination and arrangement of features recited in Applicant's Claim 18.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claims 13 and 18 are allowable. Claims 14-16 and 19-32 depend upon Claims 13 and 18, and are therefore allowable for at least the reasons that Claims 13 and 18 are allowable.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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